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Descriptions of Three *Nymphicula* Species from the Philippines (Lepidoptera, Crambidae)

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Abstract. Two new species of the genus *Nymphicula* are described from Luzon island: *Nymphicula morimotoi* and *N. luzonensis*, with a redescription of *N. manilensis* Sauber, which has been the only species of the genus from the Philippines. The larvae and biological notes of the new species are given. A key to the species of *Nymphicula* in the Philippines is also provided.

Key words: Taxonomy, Lepidoptera, Crambidae, *Nymphicula*, new species, larva, Philippines.

A nymphuline genus *Nymphicula* Snellen, 1880, is consisted of fifteen closely related species in the Oriental and East Palaearctic Regions. The larvae are known to be terrestrial, making portable and cylindrical cases of fine soil particles (Yoshiyasu, 1980). The moth fauna of these regions has been investigated in some taxonomic works (Snellen, 1880; Hampson, 1896; Yoshiyasu, 1980, 1987; Speidel, 1984; etc.). However, there seems to be more undescribed species in the Oriental Region (Agassiz, pers. comm.).

Up to the present, only one species, *Nymphicula manilensis* Sauber, 1902, has been known from the Philippines. In the course of a study on the Philippine Nymphulinae, in addition to *N. manilensis* I found two new species from the Luzon island and obtained information of their larval habitats. The larvae of the genus are discovered, for the first time, from the Oriental Region. In this paper I describe these new species and redescibe *N. manilensis*, with their biological notes and a key to the species of the Philippines.

Terminologies for the descriptions are followed after Yoshiyasu (1980, 1987). The holotypes of the two new species are preserved in the Laboratory of Entomology, Kyoto Prefectural University (KPU), and part of the paratypes are in the Entomological Laboratory of Kyushu University (KU), Fukuoka, and the Natural History Museum (NHM), London.

***Nymphicula manilensis* Sauber**

(Figs. 1A,B,2A, 3)

Nymphicula manilensis Sauber, 1902, In Semper, Schmet. Philipp., (2)6(2): 654 (male, type loc: Luzon).

This species is characterized in having narrow wings with produced apices and with

broadly dark brown hindwing, and much long and slender male genitalia.

Male. Head with vertex fulvous; frons rounded, fuscous. Labial palpus upturned, fulvous in 1st and 2nd segments, fuscous in slender 3rd segment. Maxillary palpus short, narrow; proboscis with fuscous scales at base. Antenna filiform, with fulvous scales on dorsal surface of flagellum.

Thorax above fuscous, beneath whitish. Foreleg with femur short, with long scales from proximal margin; tibia as long as femur, fulvous, distally widened by fuscous scales; 1st to 3rd tarsomeres a little wide laterally by fulvous but being fuscous scales distally. Midleg slender, with femur longer than in foreleg, with a series of thick and fulvous scales ventrally throughout it; tibia fulvous; tarsus whitish to fulvous. Hindleg with a tuft of fulvous but posteriorly black scales from coxa; femur as in midleg, tibia slender, with a long preapical inner spur, about 1/2 of tibia, and twice as long as outer spur. Abdomen above fulvous but paler on anterior segments, beneath whitish; tympanal organ whitish, with developed second vanua.

Wing shape & marking: Forewing with costa straight; apex much produced, narrowly rounded; termen oblique to end of vein CuA₂, then curved to rounded tornus; inner margin weakly curved. Costal margin evenly pale orange to postmedial white band (PMW); proximal area broadly fuscous; antemedial line (AML) innerly oblique; medial area relatively narrow, whitish, scattered with several dark brown scales; anterior portion of PMW perpendicular to costal margin, whitish, with its posterior portion faintly edged by fuscous; tornal marking rather broad, outerly oblique and its anterior proximal margin touched with medial area, fuscous covered with metallic purplish blue scales; submarginal white band (SMW) narrowly wedge-shaped to vein CuA₁, proximal and distal margins edged by fuscous scales; marginal line (MGL) narrow, extending to vein CuA₂, fuscous. Cilia whitish with some dark brown scales, but apex, tornus and proximal 1/3 evenly fuscous.

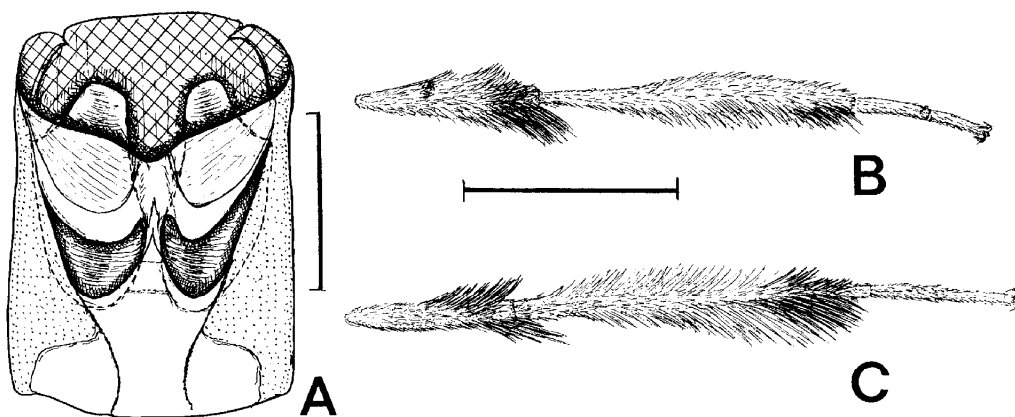


Fig. 1. A. Tympanal organ of *Nymphicula manilensis*; B. left foreleg in dorsal view, *N. manilensis*; C. ditto, *N. morimotoi* sp. nov. Scales for A: 0.5 mm; B & C: 1.0 mm.

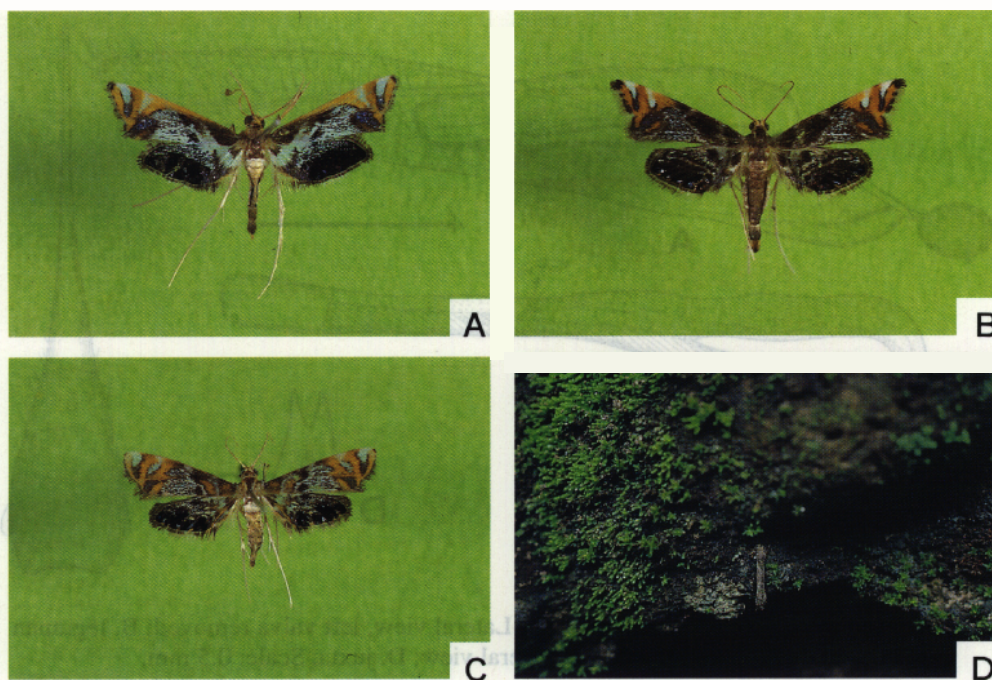


Fig. 2. A. *N. manilensis*, male, Los Baños, I.vi.1984; B. *N. morimotoi* sp. nov., holotype male; C. *N. luzonensis* sp. nov., holotype female; D. a larva of *N. morimotoi* sp. nov. on a rock along creek where the host is growing at Los Baños (Nov., 1984).

Hindwing relatively shorter than forewing; costal margin roundly curved; apex narrowly produced, termen slightly undulate to broad tornus. Proximal area narrowly fuscous; AMW wide, whitish; discocellular lunule narrowly marked by a fuscous bar; medial area whitish with dark brown scales; SML parallel with termen, almost fused with wider submarginal spots which are not clearly separated and occupy at distal 1/2 of wing; cilia as in forewing.

Male genitalia: Tegumen longer than wide, with narrow fenesturula. Vinculum narrow, longer than height of tegumen. Saccus rounded in lateral view. Uncus long and slender, almost straight in lateral view, about 2.8 times as long as height of tegumen; lateral setae constricted at proximal portion. Gnathos relatively short. Valva much narrow and long, extending far beyond apex of uncus, with narrowly rounded apex; inner surface with rather long setae at medial to apical portion. Phallus long; coecum penis 1/3 of whole length of phallus; bulbus ejaculatorius well developed; vesica with 2 cornuti of which the anterior smaller one have some minute spines. Juxta rather strongly bifurcated at apex.

Hair pencil from intersegmental area between 7th and 8th abdominal segments fulvous, mixed with fuscous.

Biology. Unknown.

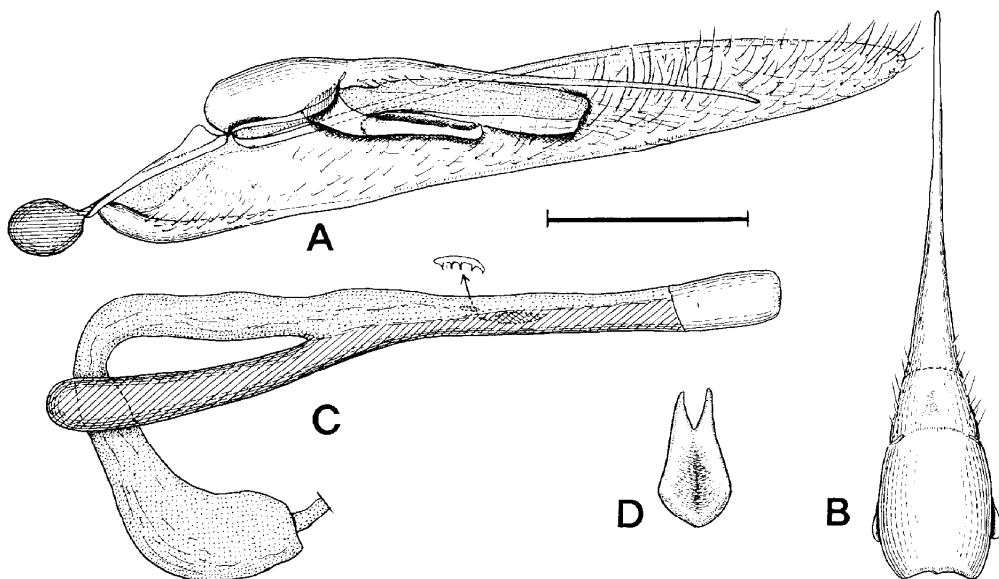


Fig.3. Male genitalia of *N. manilensis*. A. Lateral view, left valva removed; B. tegumen & uncus, dorsal view; C. phallus, lateral view; D. juxta. Scale: 0.5 mm.

Specimen examined. 1 male (5.4 mm in forewing), Mt. Maquilin. Los Baños, Luzon. 1.vi.1984 (Y. Yoshiyasu)(KPU).

Remarks. The identification of this species is based on a photo of the holotype of *Nymphicula manilensis*. The species is allied to the following new species in having the much produced apex of forewing and darker ground color, but differs from the latter in the forewing with pale orange costal margin and with purely white AMW, and much slender male genitalia.

Nymphicula morimotoi sp. nov.

(Figs. 1C, 2B, D, 4, 5, 8B, C, D, E, H, 9A)

This species is characteristic in having the forewing termen strongly incised proximally at vein CuA₂ and the more blackish wings than in *N. manilensis*.

Size of forewing: male 5.5 - 6.3 mm ($n=9$), female 5.9 - 6.3 mm ($n=7$).

Male. Head with vertex fulvous, frons rounded, fulvous. Maxillary palpus narrow, dilated anteriorly; proboscis with dark brown scales at base. Labial palpus with 1st segment fulvous scalling ventrally; 2nd and 3rd narrow, acutely upturned, fulvous. Antenna filiform, with fuscous scales on upper surface of each flagellar segment. Thorax above ochraceous to fuscous, beneath fulvous. Foreleg with tibia and 1st to 3rd tarsomeres more widened than in *N. manilensis* by fulvous scales. Mid- and hindlegs fulvous except for brownish dorsal portion of femurs which have long and fulvous scales from its ventral portion; hindleg with coxa having a thick and fulvous mixed with blackish scales tuft posteriorly, preapical inner spur about 1.3 times as long as outer one.

Abdomen above fuscous on anterior segments, fulvous posteriorly, beneath fulvous.

Hair pencil fulvous mixed with dark brown scales.

Wing shape & marking: Forewing with costal margin straight; apex much produced; termen strongly incised at end of vein CuA_2 , and curved to rounded tornus; inner margin a little curved. Proximal 2/3 widely suffused with dark brown scales leaving a faint whitish AMW; medial area darker than in *manilensis*; anterior portion of PMW wedge-shaped, parallel with termen, whitish, with its posterior portion clearly edged by fuscous; SMW running from costa to vein CuA_1 , parallel with PMW, whitish with metallic purplish blue scales at posterior 1/2. Ternal marking narrower than in *manilensis*, dark brown, covered with metallic purplish scales, its anterior portion wide and touched with medial area.

Apex dark brown. Cilia as in *manilensis*.

Hindwing with costa curved to rather rounded apex, termen weakly curved to tornus. Proximal area fuscous; AMW broader than in forewing; discocellular lunule represented by a broad dark brown spot; PML running obliquely to posterior margin, dark brown; SML almost fused with with marginal spots; distal half of wing broadly suffused with dark brown marginal blackish spots which are not clearly separated; marginal area along termen with some groups of metallic blue purplish scales and speckles of pale orange scales distally. Cilia as in forewing.

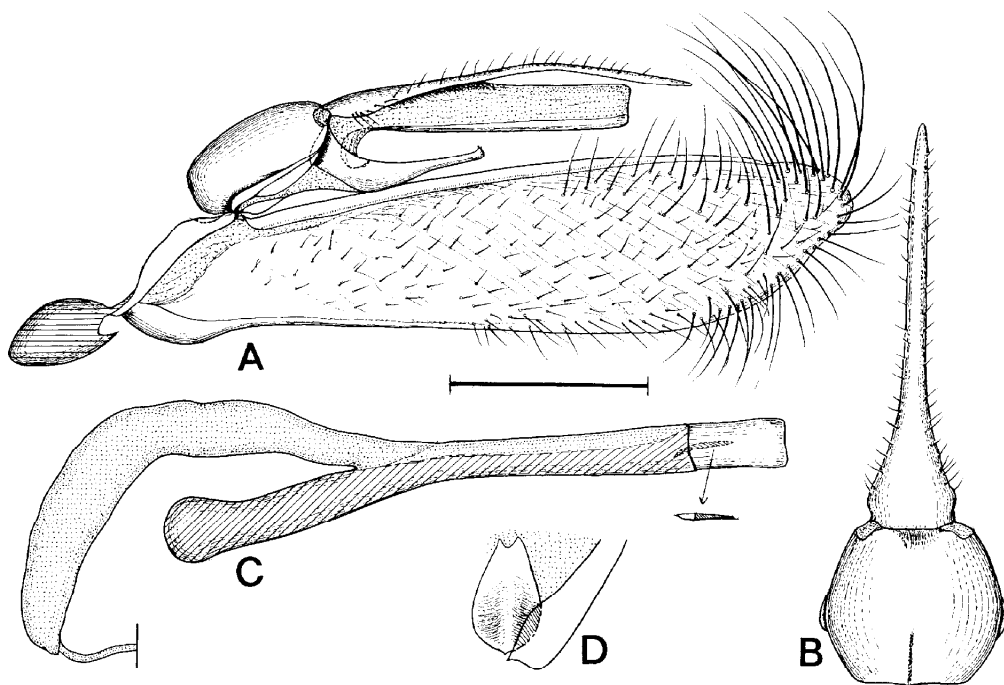


Fig.4. Male genitalia of *N. morimotoi* sp. nov. A. Lateral view, left valva removed; B. tegumen & uncus, dorsal view; C. phallus, lateral view; D. juxta. Scale: 0.5 mm.

Male genitalia: Tegumen short, a little longer than wide, curved at sides dorsally, with a longitudinal ridge along middorsal line at proximal 1/3. Vinculum longer than height of tegumen. Saccus elliptical laterally. Uncus articulated with tegumen proximally, about 2.3 times as long as height of tegumen, narrow and flattened, with several distinct setae laterally to apex. Gnathos almost as long as height of tegumen, curved upwards to apex in lateral view. Valva long, extending a little beyond apex of uncus, and broadened at apex which has many long and curved setae along apical margin, inner surface with many wrinkles as in the other *Nymphicula* species. Phallus long, curved; coecum penis about 1/3 of whole length of phallus, curved downwards, proximal portion broadly rounded: bulbus ejaculatorius well developed; vesica with a short cornutus which is becoming a small horn at apical portion. Juxta small, pear-shaped, somewhat weakly bifurcated at apex.

Female. Different from male in the following points. Head with antenna narrower, with more dorsal scales on flagellum. Foreleg with tibia and 1st to 3rd tarsomeres slenderer, without specialized scales. Hindcoxa lacking of a tuft of scales.

Female genitalia: Similar to *N. saigusai* Yoshiyasu, 1980, except for the following points: Ostium bursae narrower, ductus bursae moderate in length: corpus bursae about twice as long as 7th sternum, with narrow base which has minute spicules throughout it, with apical stout portion having broader area of signa, consisting of many irregularly scattered spicules; 8th segment with its tergum separated by middorsal longitudinal membranous portion; apophysis anterioris a little shorter than 7th sternum; papilla analis narrower and flattened, with short setae posteriorly; apophysis posterioris about 1.3 times as long as the anterioris.

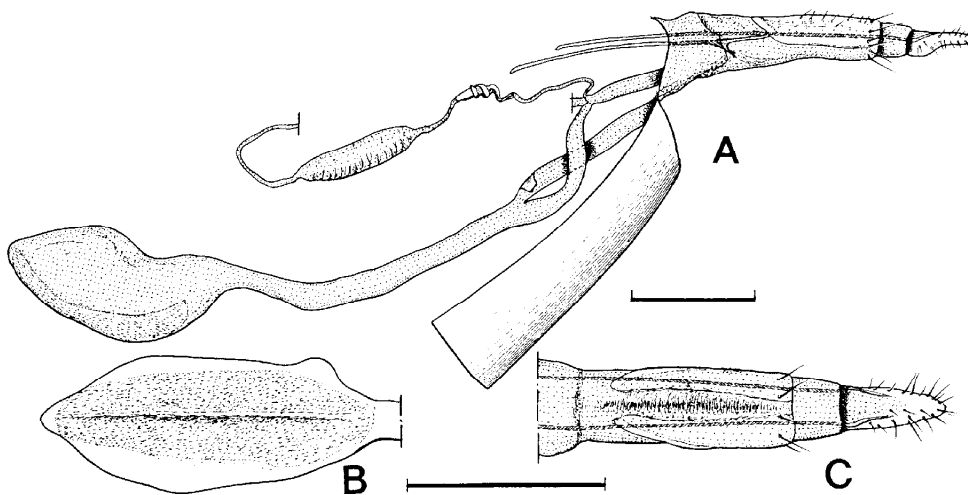


Fig.5 Female genitalia of *N. morimotoi* sp. nov. A. Lateral view; B. corpus bursae, ventral view; C. 8th to 10th abdominal segments, dorsal view. Scales: 0.5 mm.

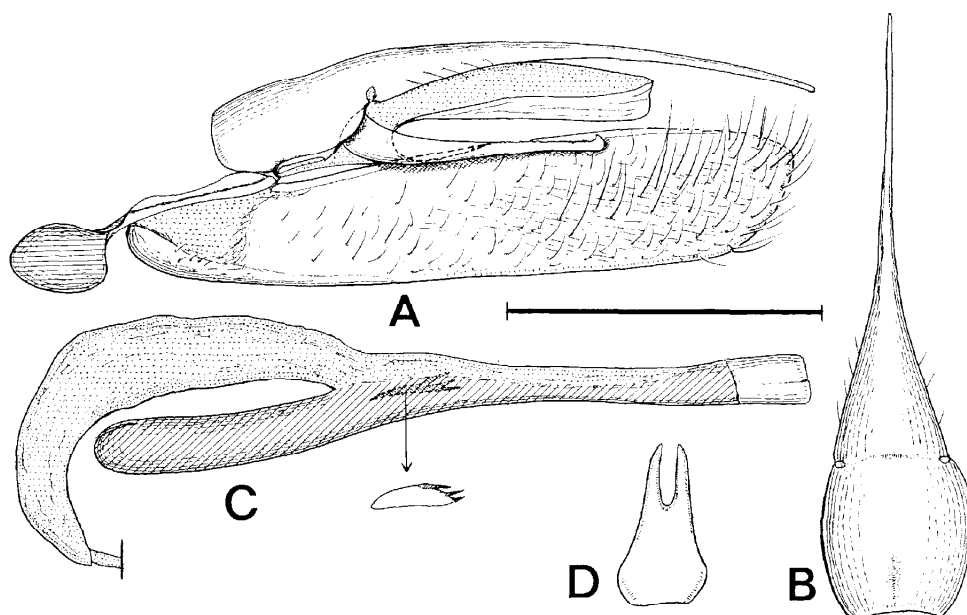


Fig.6. Male genitalia of *N.luzonensis* sp. nov. A. Lateral view, left valva removed; B. tegumen & uncus, dorsal view; C. phallus, lateral view; D. juxta. Scale: 0.5 mm.

Holotype. Male, Mt. Maquilin, Los Baños, Luzon, 30.iv. 1984 (Y.Yoshiyasu). Paratypes, 2 females and 2 males, same place as the holotype (KU), 15.iv. 1984. 1 female, 22.iv., 2 females and 2 males, 30.iv.1984 (NHM); 1 female. 6.v., 1 male, 38.v.. 1 female, 29.v.; 1 male, em. 28.x. (larva coll.on 30.ix), 1 female. em. on 28.x. (larva coll. on 7.x.), 1 male em. on 15.xi.1984 (larva coll. 28.x.1984). Banaue, Luzon (All paratypes coll. Y. Yoshiyasu).

Mature larva. Head width, 0.82 mm, body length, 9.0 mm.

Head rounded, metallic black, with long setae on its anterior portion. Ocelli I and II larger than the others. Seta AFl short. P1 much long, thrice as long as postero-lateral P2: A1 long, lateral shorter A2; L1 short, posterior to long A3; O1, O2 and O3 situated on a same line; V 1 minute, far from other setae. Mandibles with 5 teeth. rectangular in shape.

Thorax with prothoracic shield well developed to include L group of setae. Setae XDI and XD2 subequal in length, longest in prothorax; D1, D2 and L1 almost arranged on a same vertical line, parallel with anterior margin of prothoracic shield; setae SV group in a same narrow pinaculum, long, but SV2 a little shorter than SV 1. Meso- and metathoracic with minute spicules on dorsal portion; pinaculum around setae undeveloped; setae L1 and D, SD and SV group of setae long, L group short; SD1 distinct in setal socket.

First to 8th abdominal segment stouter than in thorax, with prolegs on 3rd to 6th segments small, shifted to lateral portion. Prolegs with crochets circular in arrangement. ca 26 in number, with anterior crochets longer than posterior series and incompletely biordinal. Setae of SD, L, SV, V group short, especially SD2 minute: general chaetotaxy

almost as in Japanese *Nymphicula* species. Ninth abdominal segment short, with setae longer than the preceding segments, especially in D2 and slender SD1, almost in a same vertical line. Tenth segment with anal shield indistinctly formed; setal map as in Japanese species except for D1 situated anteriorly than in *N. saigusai*; setae SV1 and sppr on anal proleg, short and slender; anal proleg with crochets biordinal medially, 17 to 18 in number.

Larval case. (Mature one: 20mm in length, 2.3 mm in width).

Fundamentally similar to Japanese *Nymphicula* species (Yoshiyasu, 1980). Cylindrical in shape, medially swollen, with caps at both entrances and covered with complete domelike eaves on both sides of which anterior one is wider than the posterior one. Coloration of cases depended on their habitat substratum, light brown to blackish, sometimes mixed with host plant fragments.

Biological notes. In the type locality, the new species lives under the canopy area in the forest along creeks. The larvae were found on the surface of stones or rocks where the Jungermaniaceae mosses (undetermined) are richly growing. They make excellent portable cases made of fine soll particles spinning tightly with silk. In the laboratory an adult female layed eggs between moss leaves one by one. Newly hatched larvae construct small and simple holes like cases spinning fine soll particles around them. Growing up to the mature larvae, they make eaves at both ends. It is noticeable that the species restricted to the area along creek, with high moisture, in tropical areas. On the other hand, the larvae of the species are also discovered at Banaue (ca. 1,500 m, asl), Luzon, a mountainous area where they inhabit along the road with host as in Japanese *Nymphicula* species. The place is cooler and wetter than in Los Baños. The life cycle is unknown, but it is probably multivoltine, judging from the collection data.

Etymology. The specific epithet name is dedicated to Prof. Emer. K. Morimoto, Kyushu Univ., who contributed to the knowledge of the curculionids fauna of the Philippines.

Distribution. The Philippines (Luzon).

Remarks. This new species is much close to *N. manilensis* in the forewing with innerly incised termen and fuscous base, and the hindwing with broad submarginal spots. However, the new species differs from the latter in the both wings with broader and purely whitish AMW, the forewing with costal margin fuscous and the hindtibia with inner preapical spur 1.3 times as long as outer one (in *manilensis* the spur twice as long as outer one), and in male genitalia.

***Nymphicula luzonensis* sp. nov.**

(Figs. 2C, 6, 7, 8A, F, G, I, 9B)

The species is distinct from the preceeding two species in having the forewing with termen not strongly incised at vein CuA₂ and the lighter wing markings.

Size of forewing: Male, 4.5 mm (paratype), female 5.0 mm (holotype)

Female. Head with vertex and frons evenly fulvous. Labial palpus acutely upturned: 3rd segment much narrow, acute at apex, fulvous. Maxillary palpus rather short: proboscis with basal scales fulvous. Antenna fulvous scaling on dorsal surface of flagellum. Thorax above fulvous, beneath whitish. Abdomen above 1st and 2nd segments whitish, the others fulvous to fuscous, beneath fuscous except for whitish tympanal

organ.

Wing shape & marking: Forewing with costa weakly curved; apex rounded; termen from apex to vein CuA_2 curved, then weakly incised there, and recurved to rounded tornus; inner margin weakly curved. Pale orange ground color as in the Japanese *Nymphicula* species. Proximal 1/3 pale orange mixed with fuscous scales; medial area smoky grey by scattering dark brown scales on whitish ground; anterior portion of PMW outerly curved; tornal marking shorter than in preceding two species. its anterior portion wider but detached with medial area.

Hindwing with costa curved to rather acute apex, termen weakly curved to tornus. Proximal 1/3 pale orange with fuscous scales; medial area suffused with fuscous; discocellular lunule represented by a narrow bar; SML indistinct, sinuate; marginal spots wide and unclearly separated on apical portions of vein Rs , M_2 , M_3 and CuA_2 of which anterior 2nd and the posterior most ones are larger than the other spots, with metallic purplish blue scales present between the spots and on veins CuA_2 and $1A+2A$.

Female genitalia: Resembled *N. morimotoi* sp. nov. in having the corpus bursae with broad area of signa, but different from the latter in the next characters; corpus bursae without a midventral keel; 8th tergum not separated at middorsal portion and lacking of setae at dorso-medial area; papilla analis more acuminate. The specimen used for description was not copulated so that corpus bursae is not swollen.

Male. Different from female as follows: Antenna ciliate, with dorsal scales sparser and fulvous; foreleg with tibia and 1st to 3rd tarsomeres somewhat widened laterally by fulvous scales; wing shape and marking as in female.

Male genitalia: Tegumen almost as long as wide, without anterior inner ridge at middorsal line as in *manilensis*; fenestrulla much narrow. Vinculum slender continued to rather well developed saccus. Uncus rather wide at base, then acuminate to apex, about 2.5 times as long as height of tegumen, weakly curved downwards in lateral view.

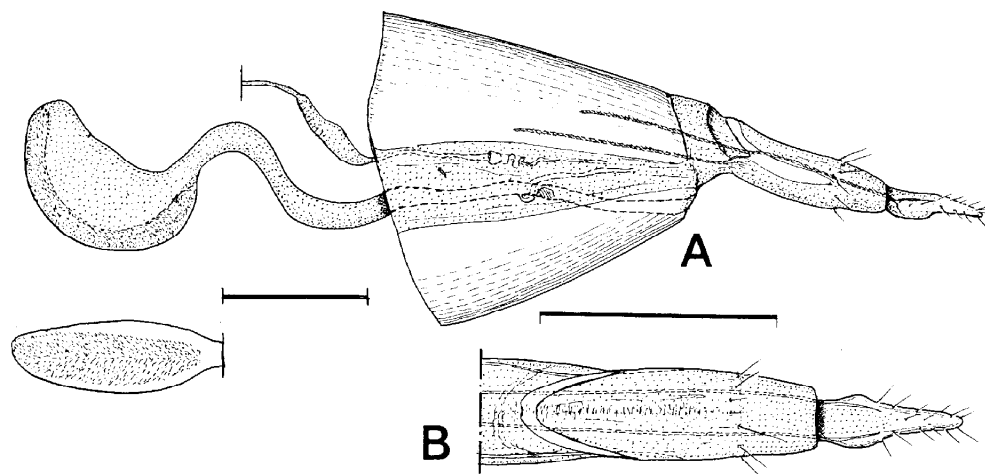


Fig.7. Female genitalia of *N. luzonensis* sp. nov. A. Lateral view, B. 8th to 10th abdominal segments, dorsal view. Scales: 1.0 mm.

Gnathos relatively long. Valva relatively short, almost extending to apex of uncus; inner surface with longer setae medial to apical margin. Phallus almost as long as length of valva; vesica with a stout cornutus, with a few short processes. Juxta long, rather strongly bifurcated at apex.

Holotype. Female, 23.vii.1984 (em. larva, coll. on 15.vii.1984), Mt. Maquilin, Los Baños, Luzon (Y. Yoshiyasu). Paratype. 1 male, 25.viii.1984 (em. larva, coll. on 15.vii.1984), same locality as the holotype (Y. Yoshiyasu).

Mature larva. Head width 0.78 mm, body length 9.5 mm.

Similar to *N. morimotoi* sp. nov., but different from the latter as follows. Head metallic black, with longer setae on anterior portion as in *morimotoi*. Meso- to metathorax with setal bases of dorsal and subdorsal areas more distinct, dark brown. Prolegs with coxal ring more distinctly extending dorsally, with crochets 25-30 in number, uniordinally and circularly arranged, of which the anterior ones longer than the posterior ones. Tenth segment with anal shield weakly developed as in the other *Nymphicula* species; setae SV1 and sppr much stouter and flattened, blackish, without pinalucum around them but many small projections around them.

Mature larval case. 18 mm in length, 2.0 mm in width.

Similar to that of *N. saigusai*, but distinguishable by the following points: case body slenderer; anterior eave more incompletely formed so that it appears to consist of two lateral arms attached each other middorsally; posterior eave extending more straightly.

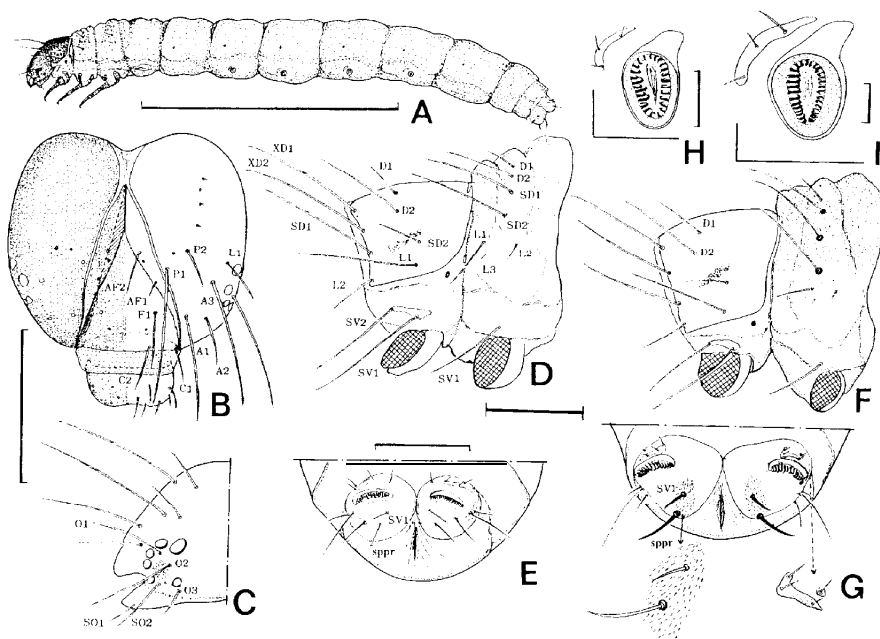


Fig.8. Larvae of *N. morimotoi* sp. nov. (B, C, D, E, H) & *N. luzonensis* sp. nov. (A, F, G, I). A. Mature larva; B. head, frontal view; C. ditto, lateral view; D & F. pro- & mesothorax, lateral view; E & G. anal proleg, ventral view; H & I. proleg. Scales for A: 5.0 mm; B & C: 0.5 mm; D, E, F, G: 0.5 mm; H, I: 0.1 mm.

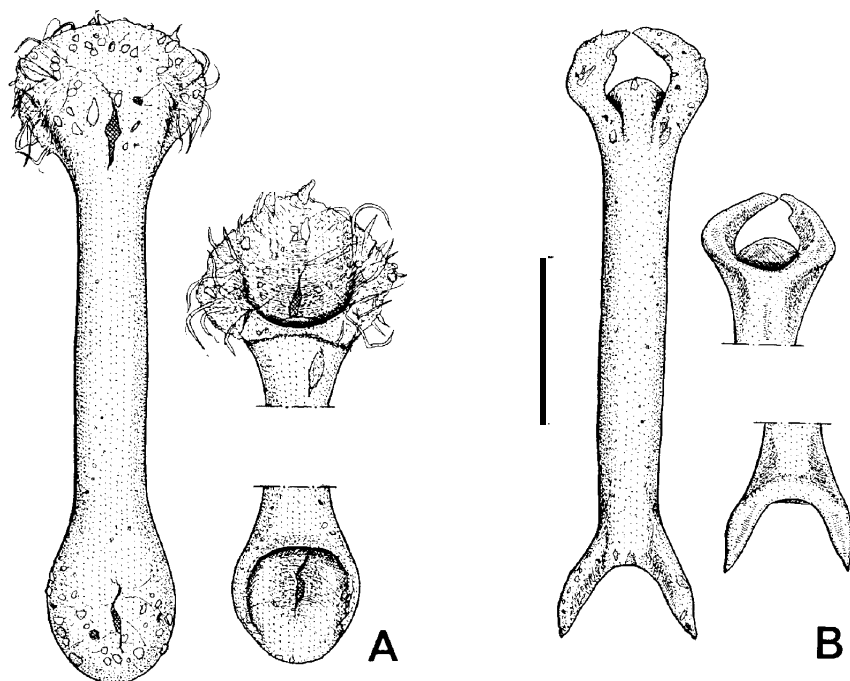


Fig.9. Larval case of *N. morimotoi* sp. nov. (A) & *N. luzonensis* sp. nov. (B), dorsal view, with anterior and posterior portion of ventral view. Scale: 5 mm.

Biological notes. The species is sympatric with *N. morimotoi* sp. nov. at Los Baños, Luzon. However, the larvae seem to live in drier places than in the latter species. At Los Baños the both species were not found in the exactly same spot, and *N. luzonensis* sp. nov. was found on rocks in the forest apart from the creek where *N. morimotoi* inhabited.

Distribution. The Philippines (Luzon).

Etymology. The specific epithet name comes from the island this new species is collected.

Remarks. The species is allied to Japanese *N. saigusai* in the forewing with straight tornal marking and broad pale orange ground color, but distinct from the latter in the hindwing with marginal spots rather unclearly marked and in the presence of cornutus in male genitalia.

A Key to the Species of *Nymphicula* of the Philippines

1. Forewing with termen strongly incised innerly at vein CuA_2 ; wings with proximal area fuscous; hindwing with marginal spots broadly fused with each other. 2
- Forewing with termen weakly incised at vein CuA_2 ; wings with proximal area pale orange mixed with fuscous; hindwing with marginal spots rather clearly

- separated, 4 in number.*..... *N. luzonensis* sp. nov.
2. Forewing with costal margin pale orange; male hindleg with inner preapical spur twice as long as outer one; male genitalia much slender, tegumen as long as wide. *N. manilensis* Sauber
- Forewing with costal margin suffused with dark brown; male hindtibia with inner preapical spur 1.3 times as long as outer one; male genitalia moderate in width, tegumen longer than wide. *N. morimotoi* sp. nov.

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